



The ArkLaMiss Observer



Winter 2010/2011 Edition

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Where is La Nina?

By Joanne Culin,
Forecaster/Editor

While this winter has not been as cold as last winter, it has still felt abnormally chilly for residents of the ArkLaMiss region. This may seem a bit confusing to climate savvy folks who were aware of one of the prevailing teleconnection patterns expected for this winter—La Nina.

La Nina is one of two phases of the El Nino Southern Oscillation (ENSO) that tends to have a great impact on regional weather conditions during the winter and spring seasons. La Nina, or Spanish for “the girl”, occurs when the sea surface temperatures (SST) across the equatorial Eastern Central Pacific Ocean will be lower than normal by 0.5 °C over the course of a few months. In contrast, El Nino, or “the boy”, occurs when the SSTs over the same region are above normal by 0.5 °C. Winter weather effects of each phase are different. Last winter, El Nino conditions prevailed, as the subtropical jet

stream became active over the Southeast. Cooler and wetter conditions reigned as the storm tracks occurred further to the south. In addition, with low tracks further south bringing moisture to the region, and cooler air moving over the moisture, this provided the set-up for the possibility for winter weather conditions. This was the case as some portions of the ArkLaMiss saw a few rounds of winter weather last winter season. The biggest of these events came in mid February as snowfall amounts up to 5-8 inches fell over central Mississippi and Northeast Louisiana. Prolonged sub-freezing temperatures also created havoc for old pipes in the Jackson area and temperatures for the entire month of January averaged 3.3 degrees below normal.

This winter, climate conditions have changed as the La Nina pattern is in control. During La Nina, the jet stream remains further north across the Ohio Valley region of the United States. Consequently, storm tracks remain north and warmer and drier

conditions prevail over the Southeast United States. This may confuse many people since temperatures this winter have mostly averaged below normal. Average temperatures for December and January have been 2.5 degrees below normal. In addition, this winter has seen four winter weather episodes, with the most recent episode dumping 4-6 inches of snow over the northern part of the ArkLaMiss.

Given these winter weather events, and below normal temperatures, one might wonder why conditions have not been “warmer and drier” as La Nina winters advertise. Another climate teleconnection does play a role in moderating the effects of La Nina/El Nino, and this being the North Atlantic Oscillation (NAO). The NAO is a climatic phenomenon in the North Atlantic Ocean that exists due to the fluctuations in the difference of atmospheric pressure at sea level between the Icelandic low and the Azores high. Through east-west oscillation motions of the Icelandic low and the Azores high, it controls the strength and direction of westerly winds, thus storm tracks, across the North Atlantic. Much of what is known about the NAO concerns the weather in Europe but what can this mean for the eastern half of North America, including the ArkLaMiss region?

If the phase of the NAO is positive, that means that the subtropical high pressure center is stronger and the Icelandic low is deeper/stronger as well. This can bring mild and wet winter conditions to the eastern United States, including the Southeast states.

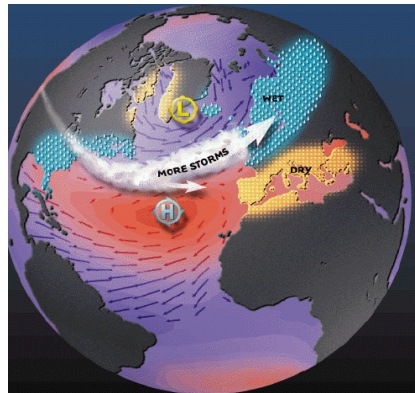


Figure 1. Illustration of the atmospheric pattern during a positive NAO. Storm tracks are further south and bring wetter conditions to the Southeast and East Coast.

However, if the NAO index is negative, this means a weak subtropical high and weak Icelandic low. In response to this, the United States east coast experiences more cold air outbreaks and snowy conditions. This might sound strangely familiar of the past few months, and that is because a negative phase NAO pattern has been in place and has been able to negate some of the effects of La Nina for our winter.

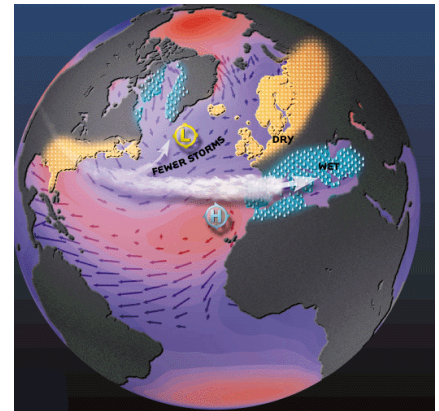


Figure 2. Illustration of the atmospheric pattern during a negative NAO. Storm tracks are further offshore and allow colder air and snowier conditions to affect the East Coast and Southeast.

The NAO pattern is not as prolonged as ENSO patterns, but can take hold and remain in place for quite some time. It is not as predictable as ENSO and thus, may cause challenges to long term climate predictions.

Thankfully, as our most famous groundhog recently predicted, it seems we are seeing an early spring. The NAO index that had been negative from November through mid January, has loosened its grip. A return to more typical La Nina conditions has occurred by mid-February. February did begin the month on the rather cold side, with a couple of winter events and record low temperatures. However, high temperatures have recently been reaching into the mid to upper 70s, thus indicating that La Nina is prevailing once again.

Long-time National Weather Service Cooperative Observer Passes Away

By Daniel Lamb, Meteorological Intern

The National Weather Service lost a dear friend and reliable weather observer two months ago. On December 17th, Mr. Lloyd Chapman, Jr. passed away at the age of 67. Mr. Chapman had served alongside his brother as the official cooperative observer for the town of Lake Providence, Louisiana since 1979. As the National Weather Service's official weather watcher for Lake Providence, Lloyd was diligent in providing thorough and accurate temperature and precipitation readings during times of both fair weather and unsettled weather. He also worked with the National Weather Service during severe weather, providing severe weather reports from throughout East Carroll Parish.



Figure 1. Lloyd Chapman (center) and his brother Eddie (left) receive an award for 30 years of service in 2008. Pictured with Alan Gerard, Meteorologist- In-Charge (right).

Mr. Chapman's dedication was made evident by some of the extreme weather events he reported in his nearly 32 years as an observer. This included several bouts of cold weather, ice storms, snow, sleet, severe weather, tornadoes, damaging winds, flooding, and periods of unusually high temperatures. Some

of the most notable extreme weather events recorded at Lake Providence during Mr. Chapman's tenure as observer include:

- Significant ice storm and temperatures as low as 4°F in December 1983.
- Single-digit temperatures, and two bouts of snow and sleet in January 1985.
- An ice storm, snow, sleet, and several days of temperatures in the teens (including one day with a high temperature of only 18°F) in February 1985.
- Very cold temperatures, including four consecutive days of low temperatures in the single digits, and one day with a high of only 14°F, multiple bouts of snow and sleet in December 1989.
- Flooding rains with a monthly total over 23 inches, including two consecutive days with over 6 inches of rain, multiple days with damaging winds in the area in April 1991.
- A deadly tornado, which also destroyed businesses in the town in November 1991.
- Wind damage and a tornado that moved through the town in March 1992.
- Significant ice storm in February 1994.
- Four days of damaging winds, rainfall amounts over an inch and a half, and three days with hail in April 1995.
- Nearly 3 inches of snow in December 1997.
- Multiple days with freezing rain and sleet in December 1998.

- Very warm temperatures, including six days with triple digit temperatures in August 2010.
- 11 consecutive days with high temperatures in the triple digits (including two days with highs of 106°F), 17 total days with highs in the triple digits, two days with damaging winds from severe thunderstorms in August and September 2000.

It is evident that Mr. Chapman was a model cooperative weather observer, though this was not the only way he served in the local community. Many residents of Lake Providence and East Carroll Parish will remember him as a dedicated fireman, a life-saving emergency responder, a helpful pharmacist, and a respected town alderman. Lloyd served as fire chief of the East Carroll Rural Fire Protection District for over 48 years, served as an assistant fire chief for the town of Lake Providence, and was an EMT for several years. He also served as a town alderman for Lake Providence for 16 years. During this time, he worked with the East Carroll Police Jury to bring Jaws of Life rescue equipment to the area. In addition, he was a licensed pharmacist for over 40 years and was part owner of Chapman's Drug.

There is little question that Mr. Lloyd Chapman touched many lives during his time on Earth. He will be greatly missed by many, including those of us here at the National Weather Service in Jackson.

Tornadoes and Severe Weather Ring in the New Year

*By Joanne Culin,
Forecaster/Editor*

The year 2010 went out with a bang and 2011 had some fireworks of its own in the early hours of the new year. A potent storm system brought a prolonged outbreak of severe thunderstorms to the Lower Mississippi Valley region from the afternoon hours of New Years Eve, lasting through the early morning hours of New Years Day. This prolonged severe weather outbreak was brought on by a highly amplified upper level trough, which was located across the western half of the United States. This in turn caused a slow eastward movement of the upper feature and its associated lift. Due to the system's slow movement, rich gulf moisture was transported northward in the preceding days. Surface dewpoints were able to reach into the lower to middle 60s during the morning and early afternoon hours on the 31st, along with temperatures rising into the lower 70s. Not only was there plenty of surface moisture, but there was also plenty of moisture throughout the entire atmosphere. One element forecasters use to assess the potential for heavy rain is the precipitable water content of the atmosphere. This is the depth of the amount of water in a column of the atmosphere if all the water in that column was precipitated as rain. This parameter is measured in inches. Generally speaking, the higher the number is the more moisture the atmosphere is carrying. Average amounts of precipitable water for late December/early January in the

ArkLaMiss are around one half of an inch. The measured precipitable water (based off the morning and afternoon upper air soundings) was around 1 to 1.5 inches.

Climatologically, an amount this high is generally greater than the 75th percentile and around the 99th. In short, the amount of moisture in the air would be consistent with the amount usually in the air during April through October. This ultimately resulted in a more volatile and very moist atmosphere. Instability was not the only ingredient which was high for this event; the environmental wind shear was extreme with 50 mph winds in the first 1 to 2 thousand feet of the atmosphere. In addition, there was plenty of dry air aloft, and this ingredient would help bring strong winds aloft to the ground. This rare combination of high instability and wind shear is mainly what supported the large outbreak and multiple strong tornadoes.

Discrete supercell thunderstorms erupted across portions of south central Louisiana by mid to late afternoon and tracked to the northeast. These storms brought penny size and quarter size hail to Catahoula and Tensas parishes along with some wind damage with estimated winds of 60 to 65 mph. The first of 11 confirmed tornadoes touched down about 3 miles south of downtown Vicksburg in Warren County. This tornado was on the ground for 4 miles and was rated at EF1 status with estimated winds of 90 mph. This tornado caused some damage

to power poles, a mobile home and the Army Corps of Engineers Engineer and Research Development Center property.

The second tornado of the severe weather event proved to be an exciting adventure for even the employees of the National Weather Service in Jackson. The tornado developed about 3 miles to the west of Terry around 4:45 pm and had the Jackson metro area in its sights. As the tornado tracked closer to the metro area, radar signatures grew increasingly better and storm spotters had reported seeing a tornado on the ground. The environment was favorable for the possibility of strong and violent tornadoes. As the tornado further entered into a highly populated area, the tornado warning was "upgraded" to a tornado emergency. The tornado moved parallel to Interstate 55 and passed through Byram. Numerous structures were damaged, billboards were blown out, a tanker truck was overturned, and trees were uprooted. At this point the tornado had reached its peak intensity with estimated winds of about 120 mph, along with a maximum path width of one half of a mile.



Figure 1. Damage to a building near Byram, MS.

The tornado continued to track through the heart of the Jackson metro area, sparing the city of Jackson. However, it crossed the Pearl River and moved into Rankin County. It caused damage to a movie theater and a Kroger in Pearl. At this point, it was looking increasingly likely that the tornado would come very close to the National Weather Service office, which is located at the northern end of the Jackson-Evers International Airport property. Forecasters at NWS Jackson notified their back-up office in Huntsville, AL of the impending tornado. About 13 staff members present during the event at this time took shelter in a designated reinforced room in the office. Staff at the Huntsville office initiated backup procedures while the Jackson personnel took shelter. During the 7 minutes that the staff took cover, they were monitoring radar information, receiving reports and staying in communication with the Huntsville office via chat software, and answering telephones as the situation evolved. The tornado passed just south of the office and the airport terminal, and produced some damage to a warehouse

building, along with downed trees. After the threat of the tornado was over, the staff at the National Weather Service in Jackson resumed normal severe weather operations.

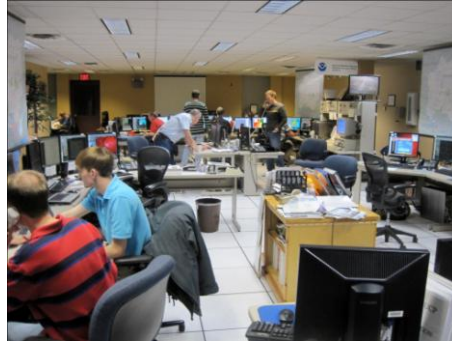


Figure 2. Staff at NWS during severe weather operations on New Year's Eve. Photo courtesy of Ariel Cohen.



Figure 3. Staff at NWS Jackson monitoring radar data via laptop in the office's tornado shelter. Picture courtesy of Ariel Cohen.

As storms continued through the evening and overnight hours, more tornadoes occurred. The strongest tornado occurred in Attala County, just after midnight on the 1st. This tornado had the distinction of being the first tornado of the new year, and it packed quite a punch. This EF-3 rated tornado had maximum sustained winds of 145 mph, carved out a path length of 23 miles and was $\frac{3}{4}$ of a mile wide. Damage was fairly extensive with

this storm as it hit a church conference center, as well as damaged some mobile homes and other structures.

A second EF-3 tornado tore through Noxubee County after 2am. The tornado started just southeast of Macon and travelled a total of 9 miles before lifting 12 miles east northeast of Macon. This tornado, with estimated maximum winds of 140 mph, caused significant damage to a dairy farm by destroying a barn, milk house, silo and a mobile home. In addition, it pushed an 18 wheeler for 25 yards, and damaged numerous other homes and buildings.



Figure 4. Building at the dairy farm that got destroyed in Noxubee County. Tin and metal is thrown into the tree on the right.

All in all, 11 confirmed tornadoes tore through the ArkLaMiss region. Of the 11, two were rated EF-3, another two were rated EF-2, six were EF-1, and one EF-0. Damaging straight line winds also brought numerous trees and large limbs down across the area. Large hail also occurred during the event with reports ranging from quarter to golf ball size. In addition, flash flooding was a significant issue

across the area. Roads were flooded in several locations, some vehicles were submerged in flood waters, and a few evacuations took place as a result of rising flood waters. A swath of 3 to 6 inches of rain fell in this event across north central Mississippi as storms repeatedly moved over the same locations. This amount of rain can be attributed to the high moisture content throughout the atmosphere.

tornadoes moving through the Jackson metropolitan area at rush hour, one might surmise that the fact that it was a holiday was a blessing. Otherwise, perhaps many more people could have been on the highways in such dangerous conditions. Overall, the year 2011 began in a way that many won't soon forget.

Questions or Comments?



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NOVEMBER 29TH-30TH TORNADO OUTBREAK ACROSS THE ARKLAMISS

By Chad Entremont, Forecaster

The secondary peak in severe weather lived up to its reputation as an outbreak of severe storms and tornadoes occurred during the last few days of November. This outbreak brought a total of 16 tornadoes to Mississippi, with 13 of these occurring in the NWS Jackson forecast area. This event occurred as potent storm system moved out of the Rockies and developed a strong area of low pressure across the Central Plains. This surface low caused a warm front to take shape and quickly lift northward across the forecast during the afternoon of the 29th. Warm and humid conditions pushed north, which led to unstable conditions over the region just ahead of the advancing strong cold front. The wind energy through the atmosphere was strong. The resulting wind shear (change in wind speed or direction with height) was strong and very. Thankfully, only 3 minor injuries occurred with this outbreak. Given the timing of some of the

favorable for rotating storms which would support tornadoes. As the clash of systems occurred, a mix of supercell thunderstorms developed, along with a broken line of thunderstorms. A handful of these storms utilized the environmental wind shear and produced tornadoes.



Figure 1. Summary of tornadoes that struck throughout the ArkLaMiss on November 29-30, 2010.

Taking a more in depth look at the NWS Jackson forecast area, 5 of the 13 tornadoes were of the strong (EF2 to EF3) variety. The strongest and most damaging tornadoes occurred across Yazoo, Leake, Attala, Oktibbeha, and

Leake and southern Attala Counties. Here, an EF3 tornado moved along a 10 mile path, destroyed numerous mobile homes, and injured 6 people.



Figure 2. Mobile homes destroyed in southern Attala County.

Four other strong tornadoes occurred and were all rated EF2. Two of these occurred in Yazoo County, one just southwest of Yazoo City and the other in downtown Yazoo City. Numerous buildings were damaged along with many trees and power lines down. Another EF2 occurred in Starkville where it destroyed multiple mobile homes in town and resulted in 15 injuries. The final EF2 occurred in Smith County. This tornado had an 11 mile path

which started just SW of Raleigh to 6 miles NE of Raleigh. One brick home sustained significant damage along with numerous other buildings and sheds damaged. A total of 21 injuries occurred during this event with no fatalities.

This outbreak broke a streak of 3 years when no tornadoes occurred during the month of November across Mississippi. Additionally, the last fall outbreak of tornadoes occurred on November 24, 2004.

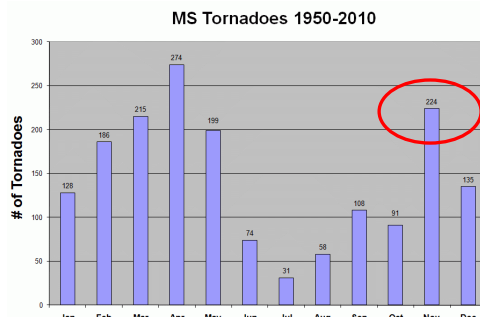


Figure 1. Number of Mississippi tornadoes from 1950-2010. The highest peak occurs in April, with the second highest peak in November.

Historically, November marks the peak of our 2nd severe weather season. Due to this year's active month, November now ranks 2nd as the most active month for tornadoes in Mississippi, April is the most active month.

NWS JACKSON COMPLETES MISSISSIPPI BLUES MARATHON RELAY (TWICE!)

By Jared Allen, Forecaster

On January 8th, and Elvis' 76th Birthday, two relay teams from NWSFO Jackson, MS competed in and completed the 4th Annual Mississippi Blues Marathon. With the Blues and Rock n'Roll music theme, the MS Blues Marathon attracted individuals from all 50 states and many foreign countries. The easy listening tunes of the Blues, numerous Elvis impersonators, and thousands of cheering fans provided great support to the nearly 3,000 runners in the Marathon. The two NWS teams were comprised of 5 individuals each, including: Intern Meteorologists, General and Senior Forecasters, and Electronic Technicians. The first four legs were five miles long and the anchor leg was 6.2 miles to equal the total marathon distance of 26.2 miles.



Figure 1. Both NWS teams after completing the Marathon.

NWS Jackson staff began training for the Mississippi Blues Marathon Relay in August of 2010. A training schedule and routine e-mails were sent out providing insight on nutrition, running gear, and most importantly, encouragement. Team members routinely met outside of work for training which furthered encouragement and support for each other. When December arrived, and training mileage increased, this support proved its worth.

Sunny skies and chilly temperatures around freezing greeted both teams at the 7AM start on race day. Despite the north wind gusting to 15mph at times during the race, both teams conquered the numerous miles and hills along the route. Team members met the anchor leg runner 300 feet from the finish line to complete the race and receive their finishers' medals together. In describing the third leg, General Forecaster Brad Bryant exclaimed,

"It was fun, a lot of hills, but the training in my neighborhood and running with others really helped me prepare."

Amazingly, given the diversity in terms of running ability of the two teams, both finished within five minutes of each other. Official Chip Time for NWS-1 and NWS-2 Teams were 05h07m38s and 05h12m00s, respectively.



Figure 2. NWS-1 crosses the finish line.



Figure 3. NWS-2 crosses the finish line, just about 5 minutes after the first team.

“Five miles is a challenge regardless, flat or hilly, but it was not as bad as I thought it would be and was a fun experience,” Lead Forecaster Chad Entremont said after completing his leg. Following the relay, some team members enjoyed the Elvis and Blues music, while others headed to work ahead of a potent winter weather system for the Deep South.

MISSISSIPPI FIREBALL OF 1/11/11

By Brad Bryant, Forecaster

It was a normal Tuesday evening at the National Weather Service office in Jackson with clear and chilly conditions across the forecast area. Around 9 PM CST, despite the benign weather, phones and various other methods of communication at the office began to demand constant attention as people from all across the Lower Mississippi River Valley reported witnessing an atmospheric phenomenon that was beyond their realm of personal experience. Even people who were indoors and not viewing the sky across portions of central and southern Mississippi still were clued into strange atmospheric processes possibly afoot since a brief flash lit up the world outside their homes as much as a close lightning strike. A few others that happened to have a vantage point of the sky at the time

of the incident observed a streak across the sky (reminiscent, although larger in the scale, of a normal “shooting star”) that seemed to culminate with a bright flash before reaching the horizon. Many of these primary observers also heard a rumbling (of low to moderate volume) lagging behind the visual action. A few others (mainly along and south of I-20 in central MS) reported the sound to be a sharper “BOOM” which was loud enough to rattle windows and be distinctly evident inside residences. It is easy to understand that some of the folks experiencing the latter initially wondered if some large, ground-based explosion had occurred.

There were other NWS offices surrounding ours also receiving reports of strange atmospheric sightings at the same time that evening, and the summation of these all these reports coming so quickly over such a widespread area had the effect of amplifying

confusion when it came to figuring out what exactly happened. It generally did not take too long for most of the public, NWS personnel, and media to assume a meteor was the cause of the fuss. However, most people had little personal experience or knowledge of incoming meteorites producing such dramatic effects around our region. Nearly all meteors (known as meteorites when they come into the earth’s atmosphere) burn up within the atmosphere and do not physically impact the earth, but a small fraction are large enough to make it to the ground before completely burning up. Some of the initial speculation shortly after the event focused on worries that this meteorite did make it to the earth’s surface, possibly retaining considerable size, and possibly making major impact in the ArkLaMiss region.

Many of these questions thrown at the meteorologists of the National Weather Service in Jackson were difficult to answer because, contrary to what the title of

“meteorologist” suggests, we are not trained experts in meteors, as well as most other largely astronomical phenomena. This inconsistency has roots in the word “meteor” referring to an object falling through the sky, although the “objects” in question were narrowed down to mainly raindrops, snowflakes, or hailstones as the science of meteorology developed through the 19th and 20th centuries. But, regardless of our relative inexperience in these matters, we were able to ascertain without too much delay that a devastating ground impact of a large meteorite had not occurred in the ArkLaMiss region, and had more than likely not occurred at all.

Since that night information coming from a variety of reputable astronomical sources has shed light on specifics of the event. The most important and interesting details are as follows:

1. Astronomers, through the use of at least one satellite, tracked a meteor between ½ and 1 meter in diameter traveling down through the Earth’s atmosphere (from NE to SW) around 8:45 PM CST and terminating somewhere in the vicinity of southern MS.
2. The meteorite travelling into the Earth’s atmosphere was likely large enough to allow some of its fragments to penetrate all the way through the Earth’s atmosphere. Thus, there are probably a few fragments

of this meteorite on the ground across southern Mississippi (although no verified extraterrestrial fragments have been recovered as of the time of this writing).

3. The low rumbling sound (or sharper “BOOM” sound) heard by some residents of central and southern Mississippi was likely a sonic boom made by exploding super-sonic fragments of the meteorites passing into the lower portion of the atmosphere overhead. Refraction of sound waves in the atmosphere can explain why people (not separated by a great distance) experienced much different sounds.
4. This meteor likely entered the Earth’s atmosphere between 20,000 and 40,000 MPH. Atmospheric resistance would cause the meteorite to slow down dramatically thereafter, with the resulting internal pressure heating the rock and contributing greatly to its break-down.
5. The extraterrestrial rock which impacted our region is commonly known as a **Bolide** (or fireball) and meteorites of its size and brightness generally only come into the Earth’s atmosphere a handful of times each month. In contrast, normal “shooting stars” are mainly produced

by meteors less than the size of a pebble which typically enter the Earth’s atmosphere more than a hundred times per day.

6. This particular meteorite likely released an energy equivalent of between 5 and 50 tons of TNT into the atmosphere. By comparison, an exploding meteorite between 20 and 40 meters in diameter created a zone of devastation of 800 square miles in Siberia in 1908 and many scientists theorize that the impact of a massive meteorite around 10 kilometers in diameter in the Yucatan Peninsula 65 million years ago was the root cause of the extinction of most dinosaurs.

Personally, I was very saddened not to have at least seen a flash out of the window during this event as the day-to-day likelihood of a meteorite of this size and visual magnitude passing overhead in the vicinity of one spot is extremely low. However, let’s hope that dramatic visual displays produced by larger meteorites are not accompanied by major ground impacts anytime soon.

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